

REMARKS

Claims 1-4 and 7-20 are pending.

Referring to Paragraph No. 8 of the Office Action, claims 1-2, 4 and 7-13 are rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by U.S. Patent No. 6,638,645 ("Sawai").

Referring to Paragraph No. 10 of the Office Action, claims 3 and 14-20 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sawai in view of U.S. Patent No. 5,766,751 ("Kotani"). Referring to Paragraph No. 11 of the Office Action, claims 14-20 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kotani.

Applicants traverse and respectfully request the Examiner to reconsider and withdraw these rejections in view of the following remarks.

Sawai does not disclose the gas-barrier layer recited by the present claims. In support of the patentability of the present claims, Applicants submit herewith a Rule 132 Declaration of Mr. Hiroshi Iwanaga.

Mr. Iwanaga conducted experiments that demonstrate that Sawai does not disclose a gas barrier film in which the difference between the oxygen transmission rate at 25 °C in a relative humidity of 10% and the oxygen transmission rate at 25 °C in a relative humidity of 90% is within the range of 1.0×10^{-5} ml/m²•day•Pa, as is recited by present claim 1.

Specifically, Mr. Iwanaga replicated Example 1 of Sawai, which is the closest example to the present claims. According to the results of the experiments set forth in Table 1 of the Declaration, in additional Example N1, the difference between the oxygen transmission rate at 20 °C in a RH of 10% and the oxygen transmission rate at 20 °C in a RH of 90% was 0.31×10^{-5}

$\text{mL}/\text{m}^2 \cdot \text{day} \cdot \text{Pa}$. In contrast, according to additional Comparative Example R1, the difference between oxygen transmission rates at 20 °C in RHs of 10% and 90% was $2.9 \times 10^{-5} \text{ mL}/\text{m}^2 \cdot \text{day} \cdot \text{Pa}$, which is substantially higher than that of additional Example N1. In addition, the oxygen transmission rate at 30 °C in RH of 90% of additional Comparative Example R1 was much higher as compared to that for additional Example N1.

Mr. Iwanaga indicates that although the difference between the oxygen transmission rates at 25 °C in RHs of 90% and 10% was not measured, a person skilled in the art would readily appreciate from the obtained data that additional Comparative Example R1 does not satisfy the difference recited in present claim 1.

Accordingly, it is Mr. Iwanaga's opinion that Sawai fails to disclose a gas barrier film having the difference in oxygen transmission recited in present claim 1.

Mr. Iwanaga also provides his comments on why the structure of the presently claimed gas barrier layer is distinguishable from Sawai and conducted an NMR experiment supporting his explanation. See pages 5-8 of the Declaration.

In this regard, Mr. Iwanaga explains that the gas barrier layer recited by present claim 1 is formed by using a polymer having a hydrogen bond-forming group, and the gas barrier layer formed thereby contains an intermolecular hydrogen bond therein. According to Mr. Iwanaga, the intermolecular hydrogen bond acts as a strong attraction force between molecules and copes flexibly with structural changes depending upon changes in humidity, which provides the excellent high gas barrier properties that were achieved with the present invention.

In contrast, Mr. Iwanaga points out that in Sawai's Example, the organic-inorganic material contains no (or at least insufficient) hydrogen bonds inside, and the main intermolecular attraction would be only weak dipole-dipole interactions caused by acrylate and siloxane groups

and van der Waals bonds therein. In addition, Mr. Iwanaga indicates that bulky groups such as the acrylate groups reduce the density of the organic-inorganic material and make it difficult to form a dense formation of the organic-inorganic material.

Therefore, it is Mr. Iwanagi's opinion (and the experiments described in the Declaration support) that Sawai's Example has a poor oxygen transmission property, and the organic-inorganic layer of Sawai's Example is different in structure from the gas barrier layer defined in claim 1.

It is also Mr. Iwanaga's opinion that a person skilled in the art would not have employed the teaching of Sawai to achieve a gas barrier laminate film because of the following disadvantages in oxygen permeability properties inherent to the process disclosed by Sawai.

In Sawai's Example, a vinyl polymerization reaction using an alkoxy group-containing photosensitive acrylic resin (B) and vinylsiloxane (C) is carried out by applying UV. See Sawai at col. 5, lines 1 to 19. However, vinyl polymerization causes volume contraction of the polymer and easily forms an oxygen permeating pass into the polymer. Further, Sawai employs Component (A) having a trifluoromethylalkyl group, and a layer containing a component having a trifluoromethylalkyl group is low in oxygen permeability property because a trifluoromethylalkyl group has weak interaction (weak hydrophilic bonds) with the other components of the matrix.

Accordingly, the gas barrier laminate film recited by present claim 1 and the method for producing a gas barrier laminate film recited by present claim 14 are not disclosed or fairly suggested by the cited art. Claims 2-4 and 7-13 and claims 15-20 depend from independent claims 1 and 14, respectively, and are patentable at least by virtue of their dependency on and the additional elements recited therein.

With further regard to the “layered compound” recited in claim 3, Applicants submit that addition of the layered compound improves the thermal deformation temperature. See the present specification at page 11, lines 11-16. Kotani fails to teach or suggest this improvement in deformation temperature. Thus, one of ordinary skill in the art would not have expected that the superior effects of the present application could be obtained by the addition of the layered compound from the disclosure of Kotani.

With further regard to the “electromagnetic wave irradiation” recited by present claim 14, it is Mr. Iwanagi’s opinion that a person skilled in the art would understand that its purpose is different from the purpose of the ultraviolet light irradiation in Sawai’s Example. In the present application, the electromagnetic wave step is carried out for the purpose of accelerating a condensation reaction of an unreacted OH group in metal alkoxide. In Sawai’s Example, the ultraviolet light is irradiated for the purpose of initiating photo polymerization of vinyl groups.

With regard to claims 18 and 19, it is also Mr. Iwanaga’s opinion that a person skilled in the art would understand that Kotani carries out the heat aging for a purpose other than drying. Kotani discloses that “it is preferred that the solvent is removed from the system and thereafter a thermal aging treatment is conducted....” See col. 12, lines 61-64 of Kotani.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the rejections based on Sawai and Kotani, alone and in combination.

Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


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